### **ACTA MATERIALIA**

# CONTENTS, AUTHOR AND KEYWORD INDEX VOLUME 48 2000

#### Board of Governors

Professor Karl A. Gschneidner Jr, Chairman Professor Thaddeus B. Massalski, Secretary Dr Robert L. Fullman, Treasurer, ex officio Professor Gareth Thomas, Managing Director, ex-officio

Dr Kenneth Kinsman Dr Howard K. Birnbaum Dr Jere H. Brophy Dr William W. Scott Jr Professor Mats Hillert Professor David G. Brandon Professor Robert H. Wagoner Professor Dr Peter Neumann

#### Principal Editors

Professor Subra Suresh, Department of Materials Science and Engineering, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Room 4-140, Cambridge, MA 02139-4307, U.S.A.

Professor Hirotaro Mori, Research Center for Ultra-High Voltage Electron Microscopy, Osaka University, Yamadaoka, Suita, Osaka 565, Japan

Professor Richard Wagner, Forschungszentrum Jülich GmbH, D-52425 Jülich, Germany

Professor Ramamoorthy Ramesh, Center for Superconductivity Research, Department of Physics and Department of Materials Science and Engineering, University of Maryland, College Park, MD 20742, U.S.A.

#### Associate Editors

Dr S. Banerjee (India)
Professor J. Th. M. De Hosson (The Netherlands)
Dr B. Derby (United Kingdom)
Dr D. Juul Jensen (Denmark)
Professor R. Kirchheim (Germany)
Dr L. P. Kubin (France)

Dr S. P. Lynch (Australia)
Professor A. Mortensen (Switzerland)
Professor F. R. N. Nabarro (South Africa)
Professor J. H. Perepezko (U.S.A.)
Professor L. Schultz (Germany)
Professor Z.-G. Wang (China)

Publishing Office: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England.



## ACTA MATERIALIA CONTENTS OF VOLUME 48

## NUMBER 1

## THE MILLENNIUM SPECIAL ISSUE

	xi	Editorial
H. Gleiter	1	Nanostructured materials: basic concepts and microstructure
F. Spaepen	31	Interfaces and stresses in thin films
<ul><li>W. J. Boettinger,</li><li>S. R. Coriell, A. L. Greer,</li><li>A. Karma, W. Kurz,</li><li>M. Rappaz and R. Trivedi</li></ul>	43	Solidification microstructures: recent developments, future directions
J. Hafner	71	Atomic-scale computational materials science
J. P. Hirth	93	Some current topics in dislocation theory
A. Needleman	105	Computational mechanics at the mesoscale
J. W. Hutchinson and A. G. Evans	125	Mechanics of materials: top-down approaches to fracture
S. Mahajan	137	Defects in semiconductors and their effects on devices
N. Setter and R. Waser	151	Electroceramic materials
S. M. Spearing	179	Materials issues in microelectromechanical systems (MEMS)
R. D. James and K. F. Hane	197	Martensitic transformations and shape-memory materials
M. E. McHenry and D. E. Laughlin	223	Nano-scale materials development for future magnetic applications
P. Grünberg	239	Layered magnetic structures in research and application
G. Wegner	253	Functional polymers
L. G. Griffith	263	Polymeric biomaterials
A. Inoue	279	Stabilization of metallic supercooled liquid and bulk amorphous alloys
M. Yamaguchi, H. Inui and K. Ito	307	High-temperature structural intermetallics
D. E. Newbury and D. B. Williams	323	The electron microscope: the materials characterization tool of the millennium

H. K. Wickramasinghe 347 Progress in scanning probe microscopy M. F. Ashby 359 Multi-objective optimization in material design and selection 371 Organization and trends in materials science and M. C. Flemings and R. W. Cahn engineering education in the US and Europe NUMBER 2 Editorial vii Announcement—2000 Acta Metallurgica Inc. J. Herbet Holloman Award Intrinsic diffusion and Kirkendall effect in Ni-Pd and Fe-M. J. H. van Dal, 385 M. C. L. P. Pleumeekers, Pd solid solutions A. A. Kodentsov and F. J. J. van Loo G. Gottstein, A. H. King and 397 The effect of triple-junction drag on grain growth L. S. Shvindlerman R. C. Atwood, S. Sridhar, 405 Diffusion-controlled growth of hydrogen pores in aluminium-silicon castings: in situ observation and W. Zhang and P. D. Lee modelling D. Ma, Y. Li, S. C. Ng and H. 419 Unidirectional solidification of Zn-rich Zn-Cu peritectic Jones alloys—I. Microstructure selection W. C. Johnson 433 Superficial stress and strain at coherent interfaces O. Grong and O. R. Myhr 445 Additivity and isokinetic behaviour in relation to diffusion controlled growth 453 Tensile properties of Ti<sub>3</sub>SiC<sub>2</sub> in the 25-1300°C M. Radovic, M. W. Barsoum, temperature range T. El-Raghy, J. Seidensticker and S. Wiederhorn M. Hillert and M. Schalin Modeling of solute drag in the massive phase 461 transformation F. Ebrahimi, J. Yanevich and 469 Deformation and fracture of the PWA 1472 superalloy D. P. Deluca single crystal On the properties of  $\alpha/\alpha+\beta$  ternary diffusion couples W. J. Boettinger, 481 S. R. Coriell, C. E. Campbell and G. B. McFadden H. S. Kim, Y. Estrin and Plastic deformation behaviour of fine-grained materials 493 M. B. Bush

<ul><li>J. Crépin, T. Bretheau,</li><li>D. Caldemaison and</li><li>F. Ferrer</li></ul>	505	Low cycle fatigue behaviour of $\beta$ treated zirconium: partial irreversibility of twinning and consequences for damage
M. Hirao, H. Ogi, N. Suzuki and T. Ohtani	517	Ultrasonic attenuation peak during fatigue of polycrystalline copper
K. S. Ravichandran and X-D. Li	525	Fracture mechanical character of small cracks in polycrystalline materials: concept and numerical <i>K</i> calculations
<ul><li>T. A. Parthasarathy,</li><li>P. R. Subramanian,</li><li>M. G. Mendiratta and</li><li>D. M. Dimiduk</li></ul>	541	Phenomenological observations of lamellar orientation effects on the creep behavior of Ti-48at.%Al PST crystals
M. R. Daymond, C. N. Tomé and M. A. M. Bourke	553	Measured and predicted intergranular strains in textured austenitic steel
D. Kovar, S. J. Bennison and M. J. Readey	565	Crack stability and strength variability in alumina ceramics with rising toughness-curve behavior
X. Wang, K. Xiao, L. Ye, Y-W. Mai, C. H. Wang and L. R. F. Rose	579	Modelling mechanical properties of core-shell rubber- modified epoxies
	587	Erratum
		NUMBER 3
	vii	Editorial
Y. Mishin and C. Herzig	589	Overview No. 136: Diffusion in the Ti-Al system
M. J. Kobrinsky and C. V. Thompson	625	Activation volume for inelastic deformation in polycrystalline Ag thin films
D. S. Grummon and R. Gotthardt	635	Latent strain in titanium-nickel thin films modified by irradiation of the plastically-deformed martensite phase with 5 MeV Ni <sup>2+</sup>
B. J. Reardon and S. R. Bingert	647	Inversion of tantalum micromechanical powder consolidation and sintering models using bayesian inference and genetic algorithms
D. Chen, C. J. Gilbert, X. F. Zhang and R. O. Ritchie	659	High-temperature cyclic fatigue-crack growth behavior in an <i>in situ</i> toughened silicon carbide
H. Takatani, C-A. Gandin and M. Rappaz	675	EBSD characterisation and modelling of columnar dendritic grains growing in the presence of fluid flow
<ul><li>W. Österle, D. Bettge,</li><li>B. Fedelich and</li><li>H. Klingelhöffer</li></ul>	689	Modelling the orientation and direction dependence of the critical resolved shear stress of nickel-base superalloy single crystals

Early-stage decomposition kinetics in Ni-Al Alloys—I. 701 P. Staron and R. Kampmann Small and wide-angle neutron scattering investigation on Ni-13 at.% Al and clusterdynamic modelling 713 Early-stage decomposition kinetics in Ni-Al alloys-II. P. Staron and R. Kampmann Clusterdynamic modelling of former experimental results 721 On the use of the micromarker technique for studying the F. Czerwinski growth mechanism of thin oxide films 735 Initiation toughness of silicon/glass anodic bonds M. L. Dunn, S. J. Cunningham and P. E. W. Labossiere X-Y. Gong, F. W. Zok, 745 The mechanics of delocalization and energy absorption in B. N. Cox and J. Davis chain composites The energy absorption potential of chain composites B. N. Cox, N. Sridhar, 755 J. B. Davis, X-Y. Gong and F. W. Zok Notch effect of surface compression and the toughening of J. S. Lin and Y. Miyamoto 767 graded Al<sub>2</sub>O<sub>3</sub>/TiC/Ni materials L. Donzel, E. Conforto and R. 777 High-temperature mechanical spectroscopy of yttria-Schaller stabilized tetragonal zirconia polycrystals (Y-TZP) with different amounts of intergranular phase B. Färber, E. Cadel, 789 Phosphorus segregation in nanocrystalline Ni-3.6 at.% P A. Menand, G. Schmitz and alloy investigated with the tomographic atom probe (TAP) R. Kirchheim **NUMBER 4** Editorial vii Overview No. 137: Grain boundaries in dielectric and R. Waser and R. Hagenbeck 797 mixed-conducting ceramics V. Rothová, I. Stloukal and Permeation of hydrogen in Ni-based superalloy CMSX-4 827 J. Čermák Q. Xu, V. V. Gupta and 835 Thermal behavior during droplet-based deposition E. J. Lavernia B. Skrotzki 851 Crystallographic aspects of deformation twinning and consequences for plastic deformation processes in  $\gamma$ -TiAl Y. X. Gao, H. Fan and 863 A thermodynamics model for solder profile evolution Z. Xiao G. Sharma, R. V. Ramanujan Instability mechanisms in lamellar microstructures 875

and G. P. Tiwari

K. Wakashima, T. Moriyama 891 Steady-state creep of a particulate SiC/6061 Al composite and T. Mori K. Kaneko, M. Kawasaki, 903 Determination of the chemical width of grain boundaries T. Nagano, N. Tamari and of boron- and carbon-doped hot-pressed  $\beta$ -SiC by HAADF S. Tsurekawa imaging and ELNES line-profile K. S. Kumar, L. Pang, 911 Structural stability of the Laves phase Cr<sub>2</sub>Ta in a two-C. T. Liu, J. Horton and phase Cr-Cr<sub>2</sub>Ta alloy E. A. Kenik A. Misra, A. A. Sharif, 925 Rapid solution hardening at elevated temperatures by J. J. Petrovic and substitutional Re alloying in MoSi<sub>2</sub> T. E. Mitchell T. Hentschel, D. Isheim, 933 Nanocrystalline Ni-3.6 at.% P and its transformation R. Kirchheim, F. Müller sequence studied by atom-probe field-ion microscopy and H. Kreye M. Nagumo, T. Yagi and 943 Deformation-induced defects controlling fracture toughness H. Saitoh of steel revealed by tritium desorption behaviors D. Vollath and D. V. Szabó 953 Nanoparticles from compounds with layered structures D. V. Shtansky, K. Nakai and 969 Decomposition of martensite by discontinuous-like Y. Ohmori precipitation reaction in an Fe-17Cr-0.5C alloy O. Sbaizero and G. Pezzotti 985 Influence of the metal particle size on toughness of Al<sub>2</sub>O<sub>3</sub>/Mo composite J. Rodríguez, A. Martín and J. 993 Modeling the effect of temperature on the wear resistance LLorca of metals reinforced with ceramic particles NUMBER 5 vii Editorial P. A. Sundaram, E. Wessel, H. 1005 Determination of the diffusion coefficient of hydrogen in Clemens, H. Kestler, gamma titanium aluminides during electrolytic charging P. J. Ennis. W. J. Quadakkers and L. Singheiser W. C. Johnson 1021 On the growth of an intermediate phase in coherently stressed thin plates T. Fujii, H. Nakazawa, 1033 Crystallography and morphology of nanosized Cr particles M. Kato and U. Dahmen in a Cu-0.2% Cr alloy R. C. Pond, P. Shang, Interfacial dislocation mechanism for diffusional phase transformations exhibiting martensitic crystallography: T. T. Cheng and M. Aindow formation of TiAl + Ti<sub>3</sub>Al lamellae I. Dutta Role of interfacial and matrix creep during thermal cycling of continuous fiber reinforced metal-matrix composites

F. Delaire, J. L. Raphanel and C. Rey	1075	Plastic heterogeneities of a copper multicrystal deformed in uniaxial tension: experimental study and finite element simulations
M. Asta and J. J. Hoyt	1089	Thermodynamic properties of coherent interfaces in f.c.cbased Ag-Al alloys: a first-principles study
M. Verwerft	1097	On the precipitation of magnesium silicide in irradiated aluminium-magnesium alloys
<ul><li>S. G. E. te Velthuis,</li><li>N. H. van Dijk,</li><li>M. T. Rekveldt, J. Sietsma and S. van der Zwaag</li></ul>	1105	Field-dependent neutron depolarization study of the ferrite formation in medium-carbon steels
A. Gholinia, P. B. Prangnell and M. V. Markushev	1115	The effect of strain path on the development of deformation structures in severely deformed aluminium alloys processed by ECAE
J. W. L. Pang, T. M. Holden, J. S. Wright and T. E. Mason	1131	The generation of intergranular strains in 309H stainless steel under uniaxial loading
<ul><li>K. Sapozhnikov,</li><li>S. Golyandin, S. Kustov,</li><li>J. Van Humbeeck and</li><li>R. De Batist</li></ul>	1141	Motion of dislocations and interfaces during deformation of martensitic Cu-Al-Ni crystals
E. A. Olevsky and R. M. German	1153	Effect of gravity on dimensional change during sintering—I. Shrinkage anisotropy
E. A. Olevsky, R. M. German and A. Upadhyaya	1167	Effect of gravity on dimensional change during sintering—II. Shape distortion
W. S. Tong, J. M. Rickman and K. Barmak	1181	Evolution of perimeter fraction during a phase transformation
R. Tewari, S. Mazumder, I. S. Batra, G. K. Dey and S. Banerjee	1187	Precipitation in 18 wt% Ni maraging steel of grade 350
V. H. Garcia, P. M. Mors and C. Scherer	1201	Kinetics of phase formation in binary thin films: the Ni/Al case
		NUMBER 6
D. H. Bae and A. K. Ghosh	1207	Grain size and temperature dependence of superplastic deformation in an Al-Mg alloy under isostructural condition
<ul><li>T. Neeraj, D-H. Hou,</li><li>G. S. Daehn and</li><li>M. J. Mills</li></ul>	1225	Phenomenological and microstructural analysis of room temperature creep in titanium alloys

J. Kanters, U. Eisele and 1239 Effect of initial grain size on sintering trajectories J. Rödel S. Schüler, B. Derby, Matrix flow and densification during the consolidation of 1247 M. Wood and matrix coated fibres C. Ward-Close A-M. Harte and N. A. Fleck 1259 Deformation and failure mechanisms of braided composite tubes in compression and torsion F. Yin, Y. Ohsawa, A. Sato 1273 Phase decomposition of the  $\gamma$  phase in a Mn-30 at.% Cu and K. Kawahara alloy during aging J. I. Pérez-Landazábal, 1283 Quantitative analysis of δ' precipitation kinetics in Al-Li M. L. Nó, G. Madariaga, alloys V. Recarte and J. San Juan F. Wakai, N. Enomoto and 1297 Three-dimensional microstructural evolution in ideal grain H. Ogawa growth—general statistics Y. L. Hao, R. Yang, 1313 The influence of alloying on the  $\alpha_2/(\alpha_2+\gamma)/\gamma$  phase Y. Y. Cui and D. Li boundaries in TiAl based systems M. Krishnan and J. B. Singh 1325 A novel B19' martensite in nickel titanium shape memory alloys I. Karaman, H. Sehitoglu, 1345 Deformation of single crystal Hadfield steel by twinning K. Gall, Y. I. Chumlyakov and slip and H. J. Maier I. Sevostianov and 1361 Modeling of the anisotropic elastic properties of plasma-M. Kachanov sprayed coatings in relation to their microstructure H. Zhang and H. Wong Self-similar growth of a compound layer in thin-film 1371 binary diffusion couples Bulk amorphous FC20 (Fe-C-Si) alloys with small A. Inoue and X. M. Wang 1383 amounts of B and their crystallized structure and mechanical properties J. M. Pelletier, J. Perez and L. 1397 Mechanical response of an oxide glass to mechanical Duffrene loading—shear and volume relaxation effects: physical analysis Y. F. Zheng, W. Cai, 1409 Microstructural development inside the stress induced J. X. Zhang, L. C. Zhao martensite variant in a Ti-Ni-Nb shape memory alloy and H. Q. Ye NUMBER 7 Y. H. Sohn and A double-serpentine diffusion path for a ternary diffusion 1427 M. A. Dayananda couple

1435 Wetting phenomena in the TiC/(Cu-Al) system

N. Froumin, N. Frage,

M. Polak and M. P. Dariel

P. Wanjara, R. A. L. Drew, 1443 Evidence for stable stoichiometric Ti<sub>2</sub>C at the interface in J. Root and S. Yue TiC particulate reinforced Ti alloy composites 1451 Experimental investigation of stress and strain fields in a E. E. Nugent, R. B. Calhoun ductile matrix surrounding an elastic inclusion and A. Mortensen 1469 Plastic deformation behaviour and operative slip systems in K. Hagihara, T. Nakano and Ni<sub>3</sub>Nb single crystals Y. Umakoshi A. K. Kronenberg, 1481 Hydrogen defects in  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> and water weakening of J. Castaing, sapphire and alumina ceramics between 600 and 1000°C— I. Infrared characterization of defects T. E. Mitchell and S. H. Kirby Hydrogen defects in α-Al<sub>2</sub>O<sub>3</sub> and water weakening of J. Castaing, sapphire and alumina ceramics between 600°C and A. K. Kronenberg, 1000°C-II. Mechanical properties S. H. Kirby and T. E. Mitchell Near-coincidence lattice method for the determination of I. Salles-Desvignes, 1505 T. Montesin, C. Valot, epitaxy strains during oxidation of metals J. Favergeon, G. Bertrand and A. Vadon An investigation of the deformation mechanism in grain J. N. Wang 1517 size-sensitive Newtonian creep Grain boundary grooving at the singular surfaces E. Rabkin, L. Klinger and 1533 V. Semenov J-J. Blandin and R. Dendievel 1541 A mesoscale model to predict the effect of microstructural heterogeneities on superplastic deformation 1551 Characteristic features of diffusion induced grain boundary N. Goukon, T. Ikeda and migration for  $\Sigma 9$  [110] asymmetric tilt boundaries in the M. Kajihara Cu(Zn) system Y. Li, K. T. Ramesh and 1563 Viscoplastic deformations and compressive damage in an E. S. C. Chin A359/SiC<sub>p</sub> metal-matrix composite Grain boundary faceting and abnormal grain growth in B-K. Lee, S-Y. Chung and S-J. L. Kang BaTiO<sub>3</sub> T. Chairuangsri and 1581 Abnormal ferrite in hyper-eutectoid steels D. V. Edmonds D. A. Stewart, P. H. Shipway 1593 Microstructural evolution in thermally sprayed WC-Co and D. G. McCartney coatings: comparison between nanocomposite and conventional starting powders O. R. Myhr and O. Grong 1605 Modelling of non-isothermal transformations in alloys containing a particle distribution D. Raabe 1617 Scaling Monte Carlo kinetics of the Potts model using rate theory

T. Ujihara and K. Osamura

1629 Kinetic analysis of spinodal decomposition process in Fe-Cr alloys by small angle neutron scattering

C. Schuh, P. Noël and D. C. Dunand	1639	Enhanced densification of metal powders by transformation-mismatch plasticity
M. Collin and D. Rowcliffe	1655	Analysis and prediction of thermal shock in brittle materials
Y-L. Shen, Y. L. Guo and C. A. Minor	1667	Voiding induced stress redistribution and its reliability implications in metal interconnects
D. V. Shtansky, K. Nakai and Y. Ohmori	1679	Crystallography and structural evolution during reverse transformation in an Fe-17Cr-0.5C tempered martensite
J. F. Nie and B. C. Muddle	1691	Characterisation of strengthening precipitate phases in a Mg-Y-Nd alloy
Y. Le Bouar and A. G. Khachaturyan	1705	Mechanism and modeling of saw-tooth structure formation in the $L1_2$ – $L1_0$ two-phase system
H. Wong, P. W. Voorhees, M. J. Miksis and S. H. Davis	1719	Periodic mass shedding of a retracting solid film step
R. Fu and T-Y. Zhang	1729	Influences of temperature and electric field on the bending strength of lead zirconate titanate ceramics
D. Ma, Y. Li, S. C. Ng and H. Jones	1741	Unidirectional solidification of Zn-rich Zn-Cu peritectic alloys—II. Microstructural length scales
<ul><li>A. Landa, P. Wynblatt,</li><li>D. J. Siegel, J. B. Adams,</li><li>O. N. Mryasov and</li><li>X-Y. Liu</li></ul>	1753	Development of glue-type potentials for the Al-Pb system: phase diagram calculation
W-J. Kim and O. D. Sherby	1763	Particle weakening in superplastic SiC/2124 Al composites at high temperature
S. Celotto	1775	TEM study of continuous precipitation in Mg-9 wt%Al-1 wt%Zn alloy
T. Hasegawa, T. Takahashi and K. Okazaki	1789	Deformation parameters governing tensile elongation for a mechanically milled Al-1.1at.%Mg-1.2at.%Cu alloy tested in tension at constant true strain rates
S. Hirosawa, T. Sato, A. Kamio and H. M. Flower	1797	Classification of the role of microalloying elements in phase decomposition of Al based alloys
S. Nagarjuna, M. Srinivas and K. K. Sharma	1807	The grain size dependence of flow stress in a Cu-26Ni-17Zn alloy

D. R. Mumm and A. G. Evans	1815	On the role of imperfections in the failure of a thermal barrier coating made by electron beam deposition
V. Y. Kolosov and A. R. Thölén	1829	Transmission electron microscopy studies of the specific structure of crystals formed by phase transition in iron oxide amorphous films
S. L. Semiatin, D. P. DeLo and E. B. Shell	1841	The effect of material properties and tooling design on deformation and fracture during equal channel angular extrusion
S-H. Choi, J. C. Brem, F. Barlat and K. H. Oh	1853	Macroscopic anisotropy in AA5019A sheets
X-L. Xu and R. K. N. D. Rajapakse	1865	A theoretical study of branched cracks in piezoelectrics
B. J. Inkson	1883	Dislocations and twinning activated by the abrasion of $Al_2O_3$
A. Godfrey and D. A. Hughes	1897	Scaling of the spacing of deformation induced dislocation boundaries
G. Majkic, L. Wheeler and K. Salama	1907	Creep of polycrystalline $SrCo_{0.8}Fe_{0.2}O_{3-}\delta$
J. V. Fernandes and M. F. Vieira	1919	Further development of the hybrid model for polycrystal deformation
N. Wang and B. Wei	1931	Rapid solidification of undercooled Cu-Ge peritectic alloy
L. Ratke and J. Alkemper	1939	Ordering of the fibrous eutectic microstructure of Al-Al <sub>3</sub> Ni due to accelerated solidification conditions
R. C. Hugo and R. G. Hoagland	1949	The kinetics of gallium penetration into aluminum grain boundaries—in situ TEM observations and atomistic models
	1949 1959	boundaries—in situ TEM observations and atomistic
R. G. Hoagland H. Miura, T. Sakai, T. Otsuka, R. Monzen and		boundaries—in situ TEM observations and atomistic models  Sliding of copper [001]-twist grain boundaries detected by shear deformation of liquid B <sub>2</sub> O <sub>3</sub> particles on the grain
R. G. Hoagland  H. Miura, T. Sakai, T. Otsuka, R. Monzen and S. Onaka	1959	boundaries—in situ TEM observations and atomistic models  Sliding of copper [001]-twist grain boundaries detected by shear deformation of liquid B <sub>2</sub> O <sub>3</sub> particles on the grain boundaries
R. G. Hoagland  H. Miura, T. Sakai, T. Otsuka, R. Monzen and S. Onaka  K. F. Kelton  T. Link, A. Epishin,	1959 1967	boundaries—in situ TEM observations and atomistic models  Sliding of copper [001]-twist grain boundaries detected by shear deformation of liquid B <sub>2</sub> O <sub>3</sub> particles on the grain boundaries  Time-dependent nucleation in partitioning transformations  Increase of misfit during creep of superalloys and its
R. G. Hoagland  H. Miura, T. Sakai, T. Otsuka, R. Monzen and S. Onaka  K. F. Kelton  T. Link, A. Epishin, U. Brückner and P. Portella  D. T. L. van Agterveld, G. Palasantzas and	1959 1967 1981	boundaries—in situ TEM observations and atomistic models  Sliding of copper [001]-twist grain boundaries detected by shear deformation of liquid B <sub>2</sub> O <sub>3</sub> particles on the grain boundaries  Time-dependent nucleation in partitioning transformations  Increase of misfit during creep of superalloys and its correlation with deformation  Effects of precipitates in Cu upon impact fracture: an ultrahigh-vacuum study with local probe Scanning

	1	
<ul><li>I. Karaman, H. Sehitoglu,</li><li>A. J. Beaudoin,</li><li>Y. I. Chumlyakov,</li><li>H. J. Maier and</li><li>C. N. Tomé</li></ul>	2031	Modeling the deformation behavior of Hadfield steel single and polycrystals due to twinning and slip
R-J. Xie, M. Mitomo and G-D. Zhan	2049	Superplasticity in a fine-grained beta-silicon nitride ceramic containing a transient liquid
J. Koike, Y. Shimoyama, I. Ohnuma, T. Okamura, R. Kainuma, K. Ishida and K. Maruyama	2059	Stress-induced phase transformation during superplastic deformation in two-phase Ti-Al-Fe alloy
<ul><li>T. Kuwabara, M. Kuroda,</li><li>V. Tvergaard and</li><li>K. Nomura</li></ul>	2071	Use of abrupt strain path change for determining subsequent yield surface: experimental study with metal sheets
M. Kumar, W. E. King and A. J. Schwartz	2081	Modifications to the microstructural topology in f.c.c. materials through thermomechanical processing
O. A. Kaibyshev, S. N. Faizova and A. F. Hairullina	2093	Diffusional mass transfer and superplastic deformation
F. Basson and J. H. Driver	2101	Deformation banding mechanisms during plane strain compression of cube-oriented f.c.c. crystals
W. H. Guo and H. W. Kui	2117	Bulk nanostructured alloy formation with controllable grain size
<ul><li>B. Peeters, S. R. Kalidindi,</li><li>P. Van Houtte and</li><li>E. Aernoudt</li></ul>	2123	A crystal plasticity based work-hardening/softening model for b.c.c. metals under changing strain paths
X. Z. Zhang and J. F. Knott	2135	The statistical modelling of brittle fracture in homogeneous and heterogeneous steel microstructures
K. Oi, C. Lux and G. R. Purdy	2147	A study of the influence of Mn and Ni on the kinetics of the proeutectoid ferrite reaction in steels
Sung	2157	Kinetics analysis of mullite formation reaction at high temperatures
Y. Wang, D. J. Srolovitz, J. M. Rickman and R. LeSar	2163	Dislocation motion in the presence of diffusing solutes: a computer simulation study
<ul><li>M. Ekroth, R. Frykholm,</li><li>M. Lindholm, H-O. Andrén and J. Ågren</li></ul>	2177	Gradient zones in WC-Ti(C,N)-Co-based cemented carbides: experimental study and computer simulations
G. Winther, X. Huang and N. Hansen	2187	Crystallographic and macroscopic orientation of planar dislocation boundaries—correlation with grain orientation

2199 Electromigration damage in mechanically deformed Al S. P. Baker, Y-C. Joo, conductor lines: dislocations as fast diffusion paths M. P. Knauß and E. Arzt 2209 Unified rationalization of the Pitsch and T-H orientation W-Z. Zhang, F. Ye, relationships between Widmanstätten cementite and C. Zhang, Y. Qi and austenite H-S. Fang Determination of local strains in a monocrystalline turbine H. Biermann, B. von 2221 Grossmann, T. Ungár, blade by microbeam X-ray diffraction with synchrotron S. Mechsner, A. Souvorov, radiation M. Drakopoulos, A. Snigirev and H. Mughrabi P. O. Kettunen Statistical theory as applied to cyclic hardening 2231 Precipitation strengthening of stress-aged Al-xCu alloys A. W. Zhu, J. Chen and 2239 E. A. Starke 2247 Microstructural evolution in a commercial low carbon steel D. H. Shin, B. C. Kim, Y-S. Kim and K-T. Park by equal channel angular pressing T. Kato, K. Nunome, 2257 Formation of the  $\zeta$  phase at an interface between an Fe substrate and a molten 0.2 mass% Al-Zn during K. Kaneko and H. Saka galvannealing L. C. Lim, P. M. Wong and 2263 Microstructural evolution during sintering of near-M. Jan monosized agglomerate-free submicron alumina powder compacts A. Gouldstone, H-J. Koh, Discrete and continuous deformation during 2277 nanoindentation of thin films K-Y. Zeng, A. E. Giannakopoulos and S. Suresh M. Vandyoussefi, H. W. Kerr Two-phase growth in peritectic Fe-Ni alloys 2297 and W. Kurz Utility of microstructure modeling for simulation of micro-S. Yang, A. M. Gokhale and 2307 Z. Shan mechanical response of composites containing nonuniformly distributed fibers P. Müllner and 2323 Internal twinning in deformation twinning A. E. Romanov J. H. Zhu and C. T. Liu 2339 Defect structures in ZrCo<sub>2</sub> Laves phase I. Duarte and J. Banhart 2349 A study of aluminium foam formation—kinetics and microstructure D. Sun, F. Gingl, H. Enoki, D. 2363 Phase components of the sintered Mg-x wt% LaNi<sub>5</sub> (x=20-K. Ross and E. Akiba 50) composites and their hydrogenation properties G-D. Zhan, M. Mitomo, The deformation mechanisms of superplastic flow in fine-2373 R-J. Xie and K. Kurashima grained beta-silicon nitride ceramics

R. Menig, M. H. Meyers, 2383 Quasi-static and dynamic mechanical response of Haliotis M. A. Meyers and rufescens (abalone) shells K. S. Vecchio C. J. Shih, M. A. Meyers, 2399 Damage evolution in dynamic deformation of silicon V. F. Nesterenko and carbide S. J. Chen L. Pardo, A. Castro,  $(Bi_3TiNbO_9)x(SrBi_2Nb_2O_9)_1\_x$  aurivillius type structure 2421 P. Millán, C. Alemany, piezoelectric ceramics obtained from mechanochemically R. Jiménez and B. Jiménez activated oxides NUMBER 10 A. Wikström and Stresses in passivated lines from curvature measurements P. Gudmundson K. P. Mingard, B. Cantor, 2435 Macro-segregation in aluminium alloy sprayformed billets I. G. Palmer, I. R. Hughes, P. W. Alexander, T. C. Willis and J. White Swift and inverse Swift effect in alumina fiber reinforced L. Weber, B. Moser, 2451 H. U. Künzi and A. aluminum wires Mortensen 2461 B. Basu, R. G. Vitchev, Influence of humidity on the fretting wear of self-mated J. Vleugels, J. P. Celis and tetragonal zirconia ceramics O. Van Der Biest M. Schwind, J. Källqvist, 2473  $\sigma$ -phase precipitation in stabilized austenitic stainless steels J-O. Nilsson, J. Ågren and H-O. Andrén C-A. Gandin 2483 From constrained to unconstrained growth during directional solidification A. Artemey, Y. Wang and Three-dimensional phase field model and simulation of 2503 martensitic transformation in multilayer systems under A. G. Khachaturyan applied stresses J. Svoboda and P. Luk 2519 Creep deformation modelling of superalloy single crystals Spatio-temporal dynamics of the Portevin-Le Chatelier M. Lebyodkin, L. Dunin-2529 Barkowskii, Y. Bréchet, effect: experiment and modelling Y. Estrin and L. P. Kubin Y. Huang, F. J. Humphreys 2543 The annealing behaviour of deformed cube-oriented and M. Ferry aluminium single crystals 2557 Computer simulation of Pb/Al interfaces A. Landa, P. Wynblatt, E. Johnson and U. Dahmen The densification of powder mixtures containing soft and A. Zavaliangos and A. Laptev 2565 hard components under static and cyclic pressure

<ul><li>E. Pippel, J. Woltersdorf,</li><li>J. Gegner and</li><li>R. Kirchheim</li></ul>	2571	Evidence of oxygen segregation at Ag/MgO interfaces
C. M. Wang, G. S. Cargill, H. M. Chan and M. P. Harmer	2579	Structural features of Y-saturated and supersaturated grain boundaries in alumina
M. Y. He, A. G. Evans and J. W. Hutchinson	2593	The ratcheting of compressed thermally grown thin films on ductile substrates
N. Nagendra, U. Ramamurty, T. T. Goh and Y. Li	2603	Effect of crystallinity on the impact toughness of a La- based bulk metallic glass
Y. T. Pei and J. T. M. De Hosson	2617	Functionally graded materials produced by laser cladding
<ul><li>K. Matsuki, T. Aida,</li><li>T. Takeuchi, J. Kusui and</li><li>K. Yokoe</li></ul>	2625	Microstructural characteristics and superplastic-like behavior in aluminum powder alloy consolidated by equal- channel angular pressing
W. Lengauer, M. Bohn, B. Wollein and K. Lisak	2633	Phase reactions in the Nb-N system below 1400°C
C. Cayron and P. A. Buffat	2639	Transmission electron microscopy study of the $\beta'$ phase (Al-Mg-Si alloys) and QC phase (Al-Cu-Mg-Si alloys): ordering mechanism and crystallographic structure
<ul><li>T. J. Shaw, J. W. Chan,</li><li>S-H. Kang, R. McDermott,</li><li>J. W. Morris and J. Clarke</li></ul>	2655	Scanning SQUID microscope differentiation of ferromagnetic steel phases
<ul><li>E. El-Danaf, S. R. Kalidindi,</li><li>R. D. Doherty and</li><li>C. Necker</li></ul>	2665	Deformation texture transition in brass: critical role of micro-scale shear bands
M. Athènes, P. Bellon and G. Martin	2675	Effects of atomic mobilities on phase separation kinetics: a Monte-Carlo study
V. A. Snyder, J. Alkemper and P. W. Voorhees	2689	The development of spatial correlations during Ostwald ripening: a test of theory
<ul><li>P. A. Carvalho,</li><li>H. S. D. Haarsma,</li><li>B. J. Kooi,</li><li>P. M. Bronsveld and</li><li>J. T. M. De Hosson</li></ul>	2703	HRTEM study of Co <sub>7</sub> W <sub>6</sub> and its typical defect structure
T. E. Mitchell	2713	A dislocation tetrahedron for MoSi <sub>2</sub>
A. Kumar and P. R. Dawson	2719	Computational modeling of f.c.c. deformation textures over Rodrigues' space
N. J. Wittridge and J. J. Jonas	2737	The austenite-to-martensite transformation in Fe-30%Ni after deformation by simple shear

A. Charai, T. Walther,
C. Alfonso, A-M. Zahra and
C. Y. Zahra

Coexistence of clusters, GPB zones, S"-, S'- and S-phases in an Al-0.9% Cu-1.4% Mg alloy

A. Borgenstam and M. Hillert	2765	Massive transformation in the Fe-Ni system
A. Borgenstam and M. Hillert	2777	Nucleation of isothermal martensite
<ul><li>Y. Zhang, N. Wanderka,</li><li>G. Schumacher,</li><li>R. Schneider and</li><li>W. Neumann</li></ul>	2787	Phase chemistry of the superalloy SC16 after creep deformation
T. Tsuzuki and P. G. McCormick	2795	Synthesis of Cr <sub>2</sub> O <sub>3</sub> nanoparticles by mechanochemical processing
W-J. Zhang, U. Lorenz and F. Appel	2803	Recovery, recrystallization and phase transformations during thermomechanical processing and treatment of TiAl-based alloys
S. W. Banovic, J. N. DuPont and A. R. Marder	2815	The use of ternary phase diagrams in the study of high temperature corrosion products formed on Fe-5 wt% Al alloys in reducing and oxidizing environments
A. L. Greer, A. M. Bunn, A. Tronche, P. V. Evans and D. J. Bristow	2823	Modelling of inoculation of metallic melts: application to grain refinement of aluminium by Al-Ti-B
N. Goukon, T. Yamada and M. Kajihara	2837	Boundary energies of $\Sigma 11$ [110] asymmetric tilt boundaries in Cu determined from the shape of boundary silica particles
T-Y. Zhang, Y-J. Su, C-F. Qian, M-H. Zhao and L-Q. Chen	2843	Microbridge testing of silicon nitride thin films deposited on silicon wafers
P. Somani, A. B. Mandale and S. Radhakrishnan	2859	Study and development of conducting polymer-based electrochromic display devices
D. Isheim	2873	Metastable phase formation during the decomposition of Fe-20 at.% Mo
D. H. Carter and M. A. M. Bourke	2885	Neutron diffraction study of the deformation behavior of beryllium-aluminum composites
N. H. Heo, K. H. Chai and J. G. Na	2901	Correlation between interfacial segregation and surface- energy-induced selective grain growth in 3% silicon–iron alloy
V. Massardier, T. Epicier and P. Merle	2911	Correlation between the microstructural evolution of a 6061 aluminium alloy and the evolution of its thermoelectric power

D. N. Torres, R. A. Perez and F. Dyment	2925	Diffusion of tin in $\alpha$ -iron
H. Fujii, T. Matsumoto and K. Nogi	2933	Analysis of surface oscillation of droplet under microgravity for the determination of its surface tension
C. Mennicke, M-Y. He, D. R. Clarke and J. S. Smith	2941	The role of secondary oxide inclusions ("pegs") on the spalling resistance of oxide films
<ul><li>A. Paúl, J. A. Odriozola,</li><li>M. A. San Miguel,</li><li>J. Fernández Sanz and</li><li>L. J. Álvarez</li></ul>	2951	Experimental and molecular dynamics simulation analysis of LaCrO <sub>3</sub> precipitation in chromia scales
N. Goukon, T. Ikeda and M. Kajihara	2959	Growth behavior of fine grains formed by diffusion induced recrystallization in the Cu(Zn) system
L. Löchte, A. Gitt, G. Gottstein and I. Hurtado	2969	Simulation of the evolution of GP zones in Al-Cu alloys: an extended Cahn-Hilliard approach
D. A. Hughes and N. Hansen	2985	Microstructure and strength of nickel at large strains
W. Pantleon and D. Stoyan	3005	Correlations between disorientations in neighbouring dislocation boundaries
<ul><li>P. Coquay, E. De Grave,</li><li>R. E. Vandenberghe,</li><li>C. Dauwe, E. Flahaut,</li><li>C. Laurent, A. Peigney and</li><li>A. Rousset</li></ul>	3015	Mössbauer spectroscopy study of MgAl <sub>2</sub> O <sub>4</sub> -matrix nanocomposite powders containing carbon nanotubes and iron-based nanoparticles
	3025	Corrigendum
		NUMBER 12
J. Pons, V. A. Chernenko, R. Santamarta and E. Cesari	3027	Crystal structure of martensitic phases in Ni-Mn-Ga shape memory alloys
D. J. Harris, J. H. Harding and G. W. Watson	3039	Computer simulation of the reactive element effect in NiO grain boundaries
K. Nagashio, K. Kuribayashi and Y. Takamura	3049	Phase selection of peritectic phase in undercooled Nd- based superconducting oxides
E. Owczarek and T. Zakroczymski	3059	Hydrogen transport in a duplex stainless steel
S. B. Lee, D. Y. Yoon and M. F. Henry	3071	Abnormal grain growth and grain boundary faceting in a model Ni-base superalloy
S. Zhang and P. G. McCormick	3081	Thermodynamic analysis of shape memory phenomena —  I. Effect of transformation plasticity on elastic strain

S. Zhang and P. G. McCormick	3091	Thermodynamic Analysis of Shape Memory Phenomena — II. Modelling
J. G. Li and X. Sun	3103	Synthesis and sintering behavior of a nanocrystalline $\alpha$ - alumina powder
<ul><li>I. Ohnuma, Y. Fujita,</li><li>H. Mitsui, K. Ishikawa,</li><li>R. Kainuma and K. Ishida</li></ul>	3113	Phase equilibria in the Ti-Al binary system
K. Choi, J-W. Choi, D-Y. Kim and N. M. Hwang	3125	Effect of coalescence on the grain coarsening during liquid-phase sintering of TaC-TiC-Ni cermets
J. Cheng and S. Nemat-Nasser	3131	A model for experimentally-observed high-strain-rate dynamic strain aging in titanium
C. H. Iwashita and R. P. Wei	3145	Coarsening of grain boundary carbides in a nickel-based ternary alloy during creep
H. Gabrisch and D. Mukherji	3157	Character of dislocations at the $\gamma/\gamma'$ interfaces and internal stresses in nickel-base superalloys
T-S. Park and S. Suresh	3169	Effects of line and passivation geometry on curvature evolution during processing and thermal cycling in copper interconnect lines
G. B. McFadden, S. R. Coriell and R. F. Sekerka	3177	Effect of surface free energy anisotropy on dendrite tip shape
P. Bate and B. Hutchinson	3183	The effect of elastic interactions between displacive transformations on textures in steels
J. Ni, T. Ashino and S. Iwata	3193	Kinetics of ordering and disordering in the Fe-Al-Ti ternary alloy
M. Jiménez-Melendo and A. Domínguez-Rodríguez	3201	High temperature mechanical characteristics of superplastic yttria-stabilized zirconia. An examination of the flow process
M. R. Begley, D. R. Mumm, A. G. Evans and J. W. Hutchinson	3211	Analysis of a wedge impression test for measuring the interface toughness between films/coatings and ductile substrates
H. N. Lee, D. R. Johnson, H. Inui, M. H. Oh, D. M. Wee and M. Yamaguchi	3221	Microstructural control through seeding and directional solidification of TiAl alloys containing Mo and C
<ul><li>L. Weber, P. Canalis-Nieto, A</li><li>Rossoll and</li><li>A. Mortensen</li></ul>	. 3235	Fracture strength of alumina fiber reinforced aluminum wire with and without a torsional pre-strain
D. H. Shin, B. C. Kim, K-T. Park and W. Y. Choo	3245	Microstructural changes in equal channel angular pressed low carbon steel by static annealing

S. Q. Xiao and J. M. Howe
 3253 Analysis of a two-dimensional invariant line interface for the case of a general transformation strain and application to thin-film interfaces
 H. Huang and F. Spaepen
 3261 Tensile testing of free-standing Cu, Ag and Al thin films and Ag/Cu multilayers
 S. C. Hwang and R. Waser
 3271 Study of electrical and mechanical contribution to switching in ferroelectric/ferroelastic polycrystals

V. K. Tolpygo and D. R. Clarke	3283	Surface rumpling of a (Ni, Pt)Al bond coat induced by cyclic oxidation
G. Mohamed and B. Bacroix	3295	Role of stored energy in static recrystallization of cold rolled copper single and multicrystals
J. M. Pénisson and T. Vystavel	3303	Wetting of molybdenum grain boundaries by nickel: effect of the boundary structure and energy
<ul><li>H. Sehitoglu, I. Karaman,</li><li>R. Anderson, X. Zhang,</li><li>K. Gall, H. J. Maier and</li><li>Y. Chumlyakov</li></ul>	3311	Compressive response of NiTi single crystals
N. Rajmohan and J. A. Szpunar	3327	A new model for recrystallization of heavily cold-rolled aluminum using orientation-dependent stored energy
I. Sridhar and N. A. Fleck	3341	Yield behaviour of cold compacted composite powders
J. M. Manero, F. J. Gil and J. A. Planell	3353	Deformation mechanisms of Ti-6Al-4V alloy with a martensitic microstructure subjected to oligocyclic fatigue
G. J. Baczynski, R. Guzzo, M. D. Ball and D. J. Lloyd	3361	Development of roping in an aluminum automotive alloy AA6111
C. P. Chang, P. L. Sun and P. W. Kao	3377	Deformation induced grain boundaries in commercially pure aluminium
S. Aggarwal, B. Nagaraj, I. G. Jenkins, H. Li, R. P. Sharma, L. Salamanca-Riba, R. Ramesh, A. M. Dhote, A. R. Krauss and O. Auciello	3387	Correlation between oxidation resistance and crystallinity of Ti-Al as a barrier layer for high-density memories
A. C. F. Cocks and M. F. Ashby	3395	Creep-buckling of cellular solids
H. Y. Yasuda, D. Furuta and Y. Umakoshi	3401	Effect of long-range order on the cyclic deformation behaviour of Ni <sub>3</sub> Fe single crystals

<ul><li>A. J. Beaudoin, A. Acharya, S.</li><li>R. Chen,</li><li>D. A. Korzekwa and</li><li>M. G. Stout</li></ul>	3409	Consideration of grain-size effect and kinetics in the plastic deformation of metal polycrystals
J. W. Cahn and A. Novick-Cohen	3425	Motion by curvature and impurity drag: resolution of a mobility paradox
P. D. Nicolaou and S. L. Semiatin	3441	An analysis of the effect of continuous nucleation and coalescence on cavitation during hot tension testing
J. Alcalá, A. C. Barone and M. Anglada	3451	The influence of plastic hardening on surface deformation modes around Vickers and spherical indents
T. Nakano, M. Kishimoto, D. Furuta and Y. Umakoshi	3465	Effect of substitutational elements on plastic deformation behaviour of NbSi <sub>2</sub> -based silicide single crystals with C40 structure
Y. Harada and D. C. Dunand	3477	Creep properties of Al <sub>3</sub> Sc and Al <sub>3</sub> (Sc, X) intermetallics
Y. Liu and D. Favier	3489	Stabilisation of martensite due to shear deformation via variant reorientation in polycrystalline NiTi
<ul><li>H. D. Chopra, E. J. Repetski,</li><li>H. J. Brown, P. J. Chen,</li><li>L. J. Swartzendruber and</li><li>W. F. Egelhoff</li></ul>	3501	Magnetic behavior of atomically engineered NiO-Co-Cu- based giant magnetoresistance spin valves using Pb as a surface modifier
J. W. Kysar	3509	Directional dependence of fracture in copper/sapphire bicrystal
A. Morawiec	3525	Method to calculate the grain boundary energy distribution over the space of macroscopic boundary parameters from the geometry of triple junctions
C. H. Shang, D. Van Heerden, A. J. Gavens and T. P. Weihs	3533	An X-ray study of residual stresses and bending stresses in free-standing Nb/Nb <sub>5</sub> Si <sub>3</sub> microlaminates
C-G. Stefanita, D. L. Atherton and L. Clapham	3545	Plastic versus elastic deformation effects on magnetic Barkhausen noise in steel
J. Rösler and M. Bäker	3553	A theoretical concept for the design of high-temperature materials by dual-scale particle strengthening
<ul><li>J. Rösler and M. Bäker</li><li>J-F. Chou, M-H. Lin and H-Y. Lu</li></ul>	3553 3569	
J-F. Chou, M-H. Lin and		materials by dual-scale particle strengthening  Ferroelectric domains in pressureless-sintered barium

- Y. Sun and R. N. Singh

  3607 Determination of fiber bridging stress profile by debond length measurement
  - 3621 Corrigendum

<ul><li>D. I. Thomson, V. Heine,</li><li>M. C. Payne, N. Marzari</li><li>and M. W. Finnis</li></ul>	3623	Insight into gallium behavior in aluminum grain boundaries from calculation on $\Sigma = 11$ (113) boundary
Z. Horita, M. Furukawa, M. Nemoto, A. J. Barnes and T. G. Langdon	3633	Superplastic forming at high strain rates after severe plastic deformation
G. Palasantzas and J. Th. M. De Hosson	3641	Roughness effect on the measurement of interface stress
<ul><li>U. Lagerpusch, V. Mohles,</li><li>D. Baither,</li><li>B. Anczykowski and</li><li>E. Nembach</li></ul>	3647	Double strengthening of copper by dissolved gold-atoms and by incoherent SiO <sub>2</sub> -particles: how do the two strengthening contributions superimpose?
<ul><li>M. Seidel, J. Eckert,</li><li>I. Bächer, M. Reibold and</li><li>L. Schultz</li></ul>	3657	Progress of solid-state reaction and glass formation in mechanically alloyed $Zr_{65}Al_{7.5}Cu_{17.5}Ni_{10}$
G. Shao and P. Tsakiropoulos	3671	On the $\omega$ phase formation in Cr–Al and Ti–Al–Cr alloys
B. J. Kooi and J. Th. M. De Hosson	3687	Influence of misfit and interfacial binding energy on the shape of the oxide precipitates in metals; interfaces between Mn <sub>3</sub> O <sub>4</sub> precipitates and Pd studied with HRTEM
R. Yu, L. L. He, J. T. Guo, H. Q. Ye and V. Lupinc	3701	Orientation relationship and interfacial structure between $\zeta$ - $Ti_5Si_3$ precipitates and $\gamma$ -TiAl intermetallics
M. I. Mendelev and D. J. Srolovitz	3711	Kink model for extended defect migration: theory and simulations
G. Ghosh	3719	Interfacial microstructure and the kinetics of interfacial reaction in diffusion couples between Sn-Pb solder and Cu/Ni/Pd metallization
T. Aoyama and K. Kuribayashi	3739	Influence of undercooling on solid/liquid interface morphology in semiconductors
D. V. Shtansky, O. Tsuda, Y. Ikuhara and T. Yoshida	3745	Crystallography and structural evolution of cubic boron nitride films during bias sputter deposition
J. C. Sánchez-López and A. Fernández	3761	TEM study of fractal scaling in nanoparticle agglomerates obtained by gas-phase condensation
<ul><li>M. Perez, JC. Barbé,</li><li>Z. Neda, Y. Bréchet and</li><li>L. Salvo</li></ul>	3773	Computer simulation of the microstructure and rheology of semi-solid alloys under shear

J. Nuffer, D. C. Lupascu and 3783 Damage evolution in ferroelectric PZT induced by bipolar J. Rödel electric cycling C. Zhao, J. Vleugels, 3795 Hybrid sintering with a tubular susceptor in a cylindrical C. Groffils, P. J. Luypaert single-mode microwave furnace and O. van der Biest E. Flahaut, A. Peigney, 3803 Carbon nanotube-metal-oxide nanocomposites: Ch. Laurent, Ch. Marlière, microstructure, electrical conductivity and mechanical F. Chastel and A. Rousset properties NUMBER 15 A. G. Balanyuk, 3813 Mössbauer study and thermodynamic modeling of V. G. Gavriljuk, Fe-C-N alloy V. N. Shivanyuk, A. I. Tyshchenko and J. C. Rawers G. J. Fan, W. Löser, S. Roth 3823 Glass-forming ability of RE-Al-TM alloys (RE=Sm, Y; and J. Eckert TM=Fe, Co, Cu) 3833 Nanoscale inhomogeneities in melt-spun Ni-Al P. L. Potapov, P. Ochin, J. Pons and D. Schryvers D. J. Lee and J. K. Lee 3847 On coherency-induced ordering in substitutional alloys—I. Analytical A. J. Craven, K. He, 3857 Complex heterogeneous precipitation in titanium-niobium L. A. J. Garvie and microalloyed Al-killed HSLA steels—I. (Ti,Nb)(C,N) T. N. Baker particles Complex heterogeneous precipitation in titanium-niobium A. J. Craven, K. He, 3869 microalloyed Al-killed HSLA steels-II. Non-titanium L. A. J. Garvie and T. N. Baker based particles V. G. Gavriljuk, 3879 On the correlation between electron structure and short B. D. Shanina and range atomic order in iron-based alloys H. Berns B. Y. Li, L. J. Rong, 3895 Synthesis of porous Ni-Ti shape-memory alloys by self-Y. Y. Li and V. E. Gjunter propagating high-temperature synthesis: reaction mechanism and anisotropy in pore structure R. S. Kottada and 3905 The high temperature tensile and compressive deformation characteristics of magnesia doped alumina A. H. Chokshi Sensitivity of α-Zy4 high-temperature deformation textures R. E. Logé, J. W. Signorelli, 3917 Y. B. Chastel, M. Y. Perrin to the β-quenched precipitate structure and to and R. A. Lebensohn recrystallization: application to hot extrusion 3931 The precipitation of copper in abnormal ferrite and pearlite T. Chairuangsri and D. V. Edmonds in hyper-eutectoid steels

XXIII

X. Doré, H. Combeau and 3951 Modelling of microsegregation in ternary alloys: application to the solidification of Al-Mg-Si M. Rappaz 3963 Failure mechanisms associated with the thermally grown A. Rabiei and A. G. Evans oxide in plasma-sprayed thermal barrier coatings J. M. Howe, H. I. Aaronson 3977 Aspects of interphase boundary structure in diffusional and J. P. Hirth phase transformations 3985 Influence of oxygen on the crystallization behavior of B. S. Murty, D. H. Ping, Zr<sub>65</sub>Cu<sub>27,5</sub>Al<sub>7,5</sub> and Zr<sub>66,7</sub>Cu<sub>33,3</sub> metallic glasses K. Hono and A. Inoue NUMBER 16 A new hardening law for strain gradient plasticity S. H. Chen and T. C. Wang S. Müller, C. Wolverton, Predicting the size- and temperature-dependent shapes of 4007 L. -W. Wang and precipitates in Al-Zn alloys A. Zunger C. -E. Rousseau and Compositionally graded materials with cracks normal to 4021 H. V. Tippur the elastic gradient A. K. Gangopadhyay, 4035 The effect of phase separation on subsequent crystallization T. K. Croat and in Al<sub>88</sub>Gd<sub>6</sub>La<sub>2</sub>Ni<sub>4</sub> K. F. Kelton 4045 Influence of an electric field on the plastic deformation of H. Conrad and Di Yang fine-grained MgO at high homologous temperatures Atomic force microscope study of stress-induced N. Bergeon, S. Kajiwara 4053 martensite formation and its reverse transformation in a and T. Kikuchi thermomechanically treated Fe-Mn-Si-Cr-Ni alloy T. Lehnert, H. Grimmer, 4065 Characterization of shape-memory alloy thin films made up P. Böni, M. Horisberger from sputter-deposited Ni/Ti multilayers and R. Gotthardt Crystallography and morpholgy of cementite precipitates X. Huang and N. H. Pryds 4073 formed during rapid solidification of a ferritic stainless steel K. T. Moore and J. M. Howe 4083 Characterization of y plate-shaped precipitates in an Al-4.2 AT.% Ag alloy — growth kinetics, solute field, composition and modeling A. Kolleck, G. A. Schneider R-curve behavior of BaTiO<sub>3</sub>- and PZT ceramics under the 4099 and F. A. Meschke influence of an electric field applied parallel to the crack front J. B. Correia and 4115 Magnetic and structural monitoring of nanophase H. A. Davies precipitation during ageing of water-atomised Cu-5% Co alloy powders

Y. H. Wen, Y. Wang, 4125 Microstructural evolution during the  $\alpha_2 \rightarrow \alpha_2 + O$ L. A. Bendersky and transformation in Ti-AL-NB alloys: phase-field simulation L. Q. Chen and experimental validation B. N. Cox, N. Sridhar 4137 A bridging law for creeping fibres and C. R. Argento B. -N. Kim and K. Hiraga 4151 Simulation of diffusional creep accompanied by grain growth in two-dimensional polycrystalline solids H. Muto and M. Sakai 4161 The large-scale deformation of polycrystalline aggregates: cooperative grain-boundary sliding A. Epishin, T. Link, 4169 Evolution of the  $\gamma/\gamma'$  microstructure during high-P. D. Portella and temperature creep of a nickel-base superalloy U. Brückner 4179 Erratum NUMBER 17 F. Roters, D. Raabe and Work hardening in heterogeneous alloys—a microstructural approach based on three internal state variables G. Gottstein O. Hunziker, D. Dye and 4191 On the formation of a centreline grain boundary during fusion welding R. C. Reed P. A. Carvalho, M. Sijbolts, B. 4203 High-resolution transmission electron microscopy study of discontinuously precipitated Ni<sub>3</sub>Sn J. Kooi and J. Th. M. De Hosson M. T. Todinov 4217 On some limitations of the Johnson-Mehl-Avrami-Kolmogorov equation J. A. Vreeling, V. Ocelík, 4225 Laser melt injection in aluminum alloys: on the role of the Y. T. Pei, D. T. L. van oxide skin Agterveld and J. Th. M. De Hosson C. W. Anderson, G. Shi, The precision of methods using the statistics of extremes H. V. Atkinson and for the estimation of the maximum size of inclusions in C. M. Sellars clean steels M. E. Kassner, M. -T. Pérez-Determination of internal stresses in cyclically deformed Prado, K. S. Vecchio and copper single crystals using convergent-beam electron M. A. Wall diffraction and dislocation dipole separation measurements 4255 Atomistic simulation of kink-pairs of screw dislocations in M. Wen and A. H. W. Ngan body-centred cubic iron Q. Liu, J. Wert and 4267 Location-dependent lattice rotation and shear strain in N. Hansen rolled aluminium single crystals of cube and Goss orientations

J. Zackrisson, U. Rolander, 4281 Microstructure and performance of a cermet material heat-B. Jansson and H. -O. treated in nitrogen Andrén T. Nakamura, T. Wang and S. 4293 Determination of properties of graded materials by inverse analysis and instrumented indentation Sampath 4307 Deformation of Ti-56 At.% Al single crystals oriented for Q. Feng and S. H. Whang single slip by 1/2<110] ordinary dislocations 4323 Experimental and numerical investigation of idealized W. Wu, G. Jiang, R. H. Wagoner and consolidation. Part 1: static compaction G. S. Daehn G. Jiang, W. Wu, Experimental and numerical investigation of idealized G. S. Daehn and consolidation. Part II: cyclic compaction R. H. Wagoner J. Lépinoux and Y. Estrin 4337 Mechanical behaviour of alloys containing heterogeneously distributed particles: modelling with Delaunay triangulation C. W. Smith, J. N. Grima 4349 A novel mechanism for generating auxetic behaviour in reticulated foams: missing rib foam model and K. E. Evans M. Göthelid, S. Haglund and 4357 Influence of O and Co on the early stages of sintering of J. Ågren WC-Co: a surface study by AES and STM

#### **NUMBER 18/19**

## PROCEEDINGS OF THE ACTA MATERIALIA WORKSHOP ON "CERAMIC AND BIMATERIAL INTERFACES: DESIGNING FOR PROPERTIES"

#### 20-23 SEPTEMBER 1999, SEVILLE, SPAIN

A. P. Tomsia, J. S. Moya and G. Thomas	4363	Preface
M. Backhaus-Ricoult	4365	A model of oxygen-activity-dependent adsorption (desorption) to metal-oxide interfaces
A. G. Marinopoulos and C. Elsässer	4375	Microscopic structure and bonding at the rhombohedral twin interface in $\alpha\text{-}Al_2O_3$
H. Dosch and H. Reichert	4387	Ordering, disordering and segregation at binary interfaces: model system $\text{Cu}_3\text{Au}(001)$
J. R. Smith and W. Zhang	4395	Stoichiometric interfaces of Al and Ag with $Al_2O_3$
M. Voué and J. De Coninck	4405	Spreading and wetting at the microscopic scale: recent developments and perspectives
T. P. Swiler and R. E. Loehman	4419	Molecular dynamics simulations of reactive wetting in metal-ceramic systems

R. A. Marks, D. R. Chapman, D. T. Danielson and A. M. Glaeser	4425	Joining of alumina via copper/niobium/copper interlayers
P. Wynblatt	4439	The effects of interfacial segregation on wetting in solid metal-on-metal and metal-on-ceramic systems
E. Saiz, R. M. Cannon and A. P. Tomsia	4449	Reactive spreading: adsorption, ridging and compound formation
E. Rabkin and I. Snapiro	4463	Wetting of the low-angle grain boundaries
D. B. Marshall, J. R. Waldrop and P. E. D. Morgan	4471	Thermal grooving at the interface between alumina and monazite
<ul><li>K. Suganuma, M. Ueshima,</li><li>I. Ohnaka, H. Yasuda,</li><li>J. Zhu and T. Matsuda</li></ul>	4475	Lift-off phenomenon in wave soldering
C. Rado, B. Drevet and N. Eustathopoulos	4483	The role of compound formation in reactive wetting: the Cu/SiC system
P. F. Becher, G. S. Painter, E. Y. Sun, C. H. Hsueh and M. J. Lance	4493	The importance of amorphous intergranular films in self-reinforced $Si_3N_4$ ceramics
J. Luo and YM. Chiang	4501	Existence and stability of nanometer-thick disordered films on oxide surfaces
R. Pérez and P. Gumbsch	4517	An ab initio study of the cleavage anisotropy in silicon
M. P. De Boer, J. A. Knapp, T. A. Michalske, U. Srinivasan and R. Maboudian	4531	Adhesion hysteresis of silane coated microcantilevers
A. J. Kinloch, M. S. G. Little and J. F. Watts	4543	The role of the interphase in the environmental failure of adhesive joints
<ul><li>F. Yubero, M. Ocaña,</li><li>A. Caballero and</li><li>A. R. González-Elipe</li></ul>	4555	Structural modifications produced by the incorporation of Ar within the lattice of Fe <sub>2</sub> O <sub>3</sub> thin films prepared by ion beam induced chemical vapour deposition
H. Guldberg-Pedersen and L. Bergström	4563	Stabilizing ceramic suspensions using anionic polyelectrolytes: adsorption kinetics and interparticle forces
L. E. McNeil and R. H. French	4571	Multiple scattering from rutile TiO <sub>2</sub> particles
<ul><li>S. Muralidhar, A. Jagota,</li><li>S. J. Bennison and</li><li>S. Saigal</li></ul>	4577	Mechanical behaviour in tension of cracked glass bridged by an elastomeric ligament
J.Llorca, M. Elices and Y. Termonia	4589	Elastic properties of sphere-reinforced composites with a mesophase
		XXVII

D. Chen, M. E. Sixta, 4599 Role of the grain-boundary phase on the elevatedtemperature strength, toughness, fatigue and creep X. F. Zhang, resistance of silicon carbide sintered with Al, B and C L. C. De Jonghe and R. O. Ritchie The concept of a strong interface applied to SiC/SiC F. Rebillat, J. Lamon and 4609 A. Guette composites with a BN interphase 4619 Interfacial characterization of a slurry-cast melt-infiltrated J. J. Brennan SiC/SiC ceramic-matrix composite 4629 The US Department of Energy's program on the A. L. Dragoo fundamental material science of internal interfaces 4635 Modeling and simulation of grain growth in Si<sub>3</sub>N<sub>4</sub>. M. Kitayama, K. Hirao, M. Toriyama and III. Tip shape evolution S. Kanzaki M. Yoshiya, I. Tanaka and 4641 Energetical role of modeled intergranular glassy film in H. Adachi Si<sub>3</sub>N<sub>4</sub>-SiO<sub>2</sub> ceramics L. Gremillard, T. Epicier, 4647 Microstructural study of silica-doped zirconia ceramics J. Chevalier and G. Fantozzi R. Torrecillas, A. Blanco, 4653 Microstructural study of CdS/opal composites M.E. Brito, C. López, M. Míguez, F. Meseguer and J. S. Moya F. J. Oliveira, R. F. Silva and Thermochemistry of contacts between silicon nitride 4659 J. M. Vieira ceramics and steels E. Verné, C. Vitale Brovarone, 4667 Coatings on Al<sub>2</sub>O<sub>3</sub> by bioactive glass-ceramics C. Moisescu, E. Ghisolfi and E. Marmo W. B. Hanson, K. I. Ironside 4673 Active metal brazing of zirconia and J. A. Fernie K. Nakashima, H. Matsumoto 4677 Effect of additional elements Ni and Cr on wetting characteristics of liquid Cu on zirconia ceramics and K. Mori Microstructure and physical properties of some oxide V. M. Orera, R. I. Merino, 4683 eutectic composites processed by directional solidification J. A. Pardo, A. Larrea, J. I. Peña, C. González, P. Poza, J. Y. Pastor and J. Llorca A. Sayir and S. C. Farmer The effect of the microstructure on mechanical properties 4691 of directionally solidified Al<sub>2</sub>O<sub>3</sub>/ZrO<sub>2</sub>(Y<sub>2</sub>O<sub>3</sub>) eutectic E. Tzimas, H. Müllejans, 4699 Failure of thermal barrier coating systems under cyclic S. D. Peteves, J. Bressers thermomechanical loading and W. Stamm

A. Tsoga, A. Gupta, 4709 Gadolinia-doped ceria and yttria stabilized zirconia A. Naoumidis and interfaces: regarding their application for SOFC technology P. Nikolopoulos M. Jiménez-Melendo, 4715 Effect of layer interfaces on the high-temperature F. Gutiérrez-Mora and mechanical properties of alumina/zirconia laminate A. Domínguez-Rodríguez composites M. Ferraris, M. Montorsi and 4721 Glass coating for SiC<sub>t</sub>/SiC composites for high-temperature M. Salvo application E. Carreño-Morelli, 4725 Mechanical spectroscopy of thermal stress relaxation at S. E. Urreta and metal-ceramic interfaces in Aluminum-based composites R. Schaller 4735 Fabrication of fine  $\alpha$ -alumina powders by thermal K. Morinaga, T. Torikai, K. Nakagawa and S. Fujino decomposition of ammonium aluminum carbonate hydroxide (AACH) R. Escobar Galindo, 4743 Study of polymer/metal coating under stress using positron A. Van Veen, annihilation spectroscopy A. Alba García, H. Schut and J. Th. M. De Hosson J. S. Moya, M. Diaz, 4749 Zirconium oxide film formation on zircaloy by water J. F. Bartolomé, E. Roman, corrosion J. L. Sacedon and J. Izquierdo K. Niwa, Y. Kotaka, 4755 Interface between electrode and PZT memory device M. Tomotani, H. Ashida, Y. Goto and S. Otani NUMBER 20 Announcement vii A. Brunet, R. Valle and Intermetallic TiAl-based matrix composites: investigation 4763 of the chemical and mechanical compatibility of a A. Vassel protective coating adapted to an alumina fibre T. P. Swiler 4775 The role of liquid-substrate interactions on wetting in metallic embedded atom method systems M. Ohnuma, K. Hono, 4783 Small-angle neutron scattering and differential scanning calorimetry studies on the copper clustering stage of Fe-S. Linderoth, J. S. Pedersen, Si-B-Nb-Cu nanocrystalline alloys Y. Yoshizawa and H. Onodera Q. Jiang, Z. Zhang and 4791 Melting thermodynamics of nanocrystals embedded in a J. C. Li matrix J. A. Kittl, P. G. Sanders, 4797 Complete experimental test of kinetic models for rapid M. J. Aziz, D. P. Brunco alloy solidification and M. O. Thompson

Z. Yang, S. Sista, J. W. Elmer and T. Debroy	4813	Three dimensional Monte Carlo simulation of grain growth during GTA welding of titanium
O. Engler	4827	Deformation and texture of copper-manganese alloys
YM. Liu, T. E. Mitchell and H. N. G. Wadley	4841	Anisotropic damage evolution in a 0°/90° laminated ceramic-matrix composite
L. M. Hsiung and D. H. Lassila	4851	Shock-induced deformation twinning and omega transformation in tantalum and tantalum-tungsten alloys
R. Srinivasan, G. F. Eggeler and M. J. Mills	4867	$\gamma^\prime\text{-cutting}$ as rate-controlling recovery process during high-temperature and low-stress creep of superalloy single crystals
Z. Xia and W. A. Curtin	4879	Tough-to-brittle transitions in ceramic-matrix composites with increasing interfacial shear stress
H. X. Zhu, J. R. Hobdell and A. H. Windle	4893	Effects of cell irregularity on the elastic properties of open-cell foams
YJ. Su, C. F. Qian, MH. Zhao and TY Zhang	4901	Microbridge testing of silicon oxide/silicon nitride bilayer films deposited on silicon wafers
T. Zhai, A. J. Wilkinson and J. W. Martin	4917	A crystallographic mechanism for fatigue crack propagation through grain boundaries
<ul><li>A. Bollero, O. Gutfleisch,</li><li>M. Kubis, KH Müller and</li><li>L. Schultz</li></ul>	4929	Hydrogen disproportionation by reactive milling and recombination of $Nd_2(Fe_{1-x}Co_x)_{14}B$ alloys

I List of Contents, Author Index and Keyword Index, Volume 48

